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Spionidae (Annelida, Polychaeta) from Japan II. The Genus *Prionospio* (*Aquilaspio*)

By

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Abstract Four species of the genus *Prionospio* (*Aquilaspio*) are described from Japanese waters. These include two new species, herein named *Prionospio* (*Aquilaspio*) *grossa* and *P. (A.) convexa*. *Prionospio* (*Aquilaspio*) *sexoculata* AUGENER is newly recorded from Japan, whereas *P. (A.) krusadensis* was reported previously.

In the course of a study on Japanese spionids, four species including two new species of the genus *Prionospio* (*Aquilaspio*) were recorded. Of these species, *Prionospio* (*Aquilaspio*) *krusadensis* FAUVEL, 1929, was previously reported from Japanese waters, but *P. (A.) sexoculata* is newly reported. Each of two new species has four pairs of pinnate branchiae and a caruncle extending posteriorly to setiger 3. Species of *Prionospio* with these characteristics have not been previously reported from Japan.

The bulk of the collection, including type-specimens, is deposited in the National Science Museum, Tokyo.

The author wishes to thank Dr. Nancy J. MACIOLEK, Massachusetts, U.S.A. for her many helpful suggestions and reading the manuscript; and to Dr. G. HARTMANN-SCHRÖDER, Zoologisches Institut und Zoologisches Museum, Hamburg for the loan of material for examination.

Genus *Prionospio* (*Aquilaspio*) FOSTER, 1971

Diagnosis. Prostomium subtriangular. Anterior border rounded or sometimes extended slightly laterally; continues posteriorly as a more or less well-developed keel. Peristomium surrounding prostomium as a hood, developed to varying degrees. All branchiae with digitiform pinnules, two to four pairs, beginning on setiger 2. Anterior setae all capillary. Tridentate or multidentate hooded hooks present in posterior setigers of neuro- and notopodia. Pygidium with anal cirri.

Key to Japanese Species of *Prionospio* (*Aquilaspio*)

1. With two pairs of branchiae with digitiform pinnules
..... *Prionospio* (*Aquilaspio*) *sexoculata* AUGENER
- 1'. With three to four pairs of branchiae with digitiform pinnules 2
2. With three pairs of branchiae; caruncle extending posteriorly to setiger 1; without

- notosetae on setiger 1 *P. (A.) krusadensis* FAUVEL
- 2'. With four pairs of branchiae; caruncle extending posteriorly to setiger 3; with notosetae on setiger 1 3
3. Prostomium bell-shaped with rounded anterior margin; dorsal crest appearing from setiger 5 *P. (A.) grossa* sp. nov.
- 3'. Prostomium fusiform with convex anterior margin; dorsal crest appearing from setiger 6 *P. (A.) convexa* sp. nov.

***Prionospio (Aquilaspio) sexoculata* AUGENER, 1918**

(Fig. 2 a-k)

Prionospio sexoculata AUGENER, 1918, pp. 405–408, pl. 6, fig. 159, 172, text-fig. 52; DAY, 1955, p. 414; 1967, p. 489, fig. 18.8. m–o.

Aquilaspio sexoculata: FOSTER, 1971, p. 106.

Material examined. Hakodate Harbour, 41°47.4'N, 140°42.5'E, in 12 m (1 specimen), X–1979, coll. S. NAKAO. Off Asamushi, Mutsu Bay, in 9–11 m (20), V–VIII–1971. Off Tanabe, Mutsu Bay, 41°16.5'N, 141°10.7'E, in 7 m (2), 41°13.2'N, 141°12.5'E, in 18 m (2), I–1973. Off Tsutsumigawa, Mutsu Bay, 40°50.0'N, 140°46.0'E, in 6 m (1), I–1973. Yamada Bay, in 27 m (2), VII–1967. Otsuchi Bay, 39°20.4'N, 141°55.8'E, in 10 m (8), 39°20.5'N, 141°56.2'E–39°20.5'N, 141°56.5'E, in 24–25 m (1), VII–1985. Kamaishi Bay, in 19 m (21), XI–1973. Banzu, Chiba Pref., in tidelands (1), VI–1974. Tokyo Bay, 35°20.0'N, 139°40.0'E, in 20 m (1), III–1983. Nagaura Bay, Yokosuka, 35°17.7'N, 139°38.5'E, in 9 m (4), 35°19.2'N, 139°40.1'E, in 8.6 m (2), 35°18.8'N, 139°39.7'E, in 14 m (3), X–1977. Off Aburatsubo Bay, Sagami Bay, in 10 m (9), III–1979. Sagami Bay, 35°16.3'N, 139°33.1'E, in 20 m (1), 35°12.3'N, 139°36.3'E, in 8 m (1), VII–1979. Oura Bay, Shimoda, intertidal zone (4), X–1970. Tsukumo Bay, Noto Peninsula, in 10–25 m (23), V–1973. Tsuruga Bay, in 8 m (2), IV–1976, coll. I. HAYASHI. Off Yuragawa, Wakasa Bay, in 10 m (11), IV–1976, coll. H. YOKOYAMA. Tosa Bay, 33°28.3'N, 133°33.7'E, in 23 m (3), IV–1970. Omura Bay, 32°57.0'N, 128°55.5'E, in 9 m (1), VI–1972, 32°51.0'N, 128°52.0'E, in 10 m (1), 32°51.3'N, 128°50.9'E, in 10 m (1), 32°55.5'N, 128°55.4'E, in 9 m (1), XI–1972, 32°54.0'N, 128°56.0'E, in 10 m (1), II–1973, coll. T. OKINO. Sasebo Bay, 33°08.2'N, 128°42.8'E, in 12 m (1), VIII–1972. Tomioka Bay, Amakusa, Kyushu, in 10 m (5), V–1978, coll. H. TSUTSUMI.

Description. Largest complete individual with 107 setigers, measuring 27 mm in length and about 0.5 mm in width including parapodia. Body slender, subcylindrical, colorless in alcohol.

Prostomium rectangular, with a minute medial protuberance on anterior margin, slightly inflated at level of eyes, truncate for 2/3 length, then narrowing to form caruncle extending to setiger 1; two pairs of eyes, anterior pair largest (Fig. 2 a, b). Peristomium dorsally fused with setiger 1, forming moderate lateral wings (Fig. 2 b).

Branchiae present on setigers 2 and 3, both pairs with digitiform pinnules extend-

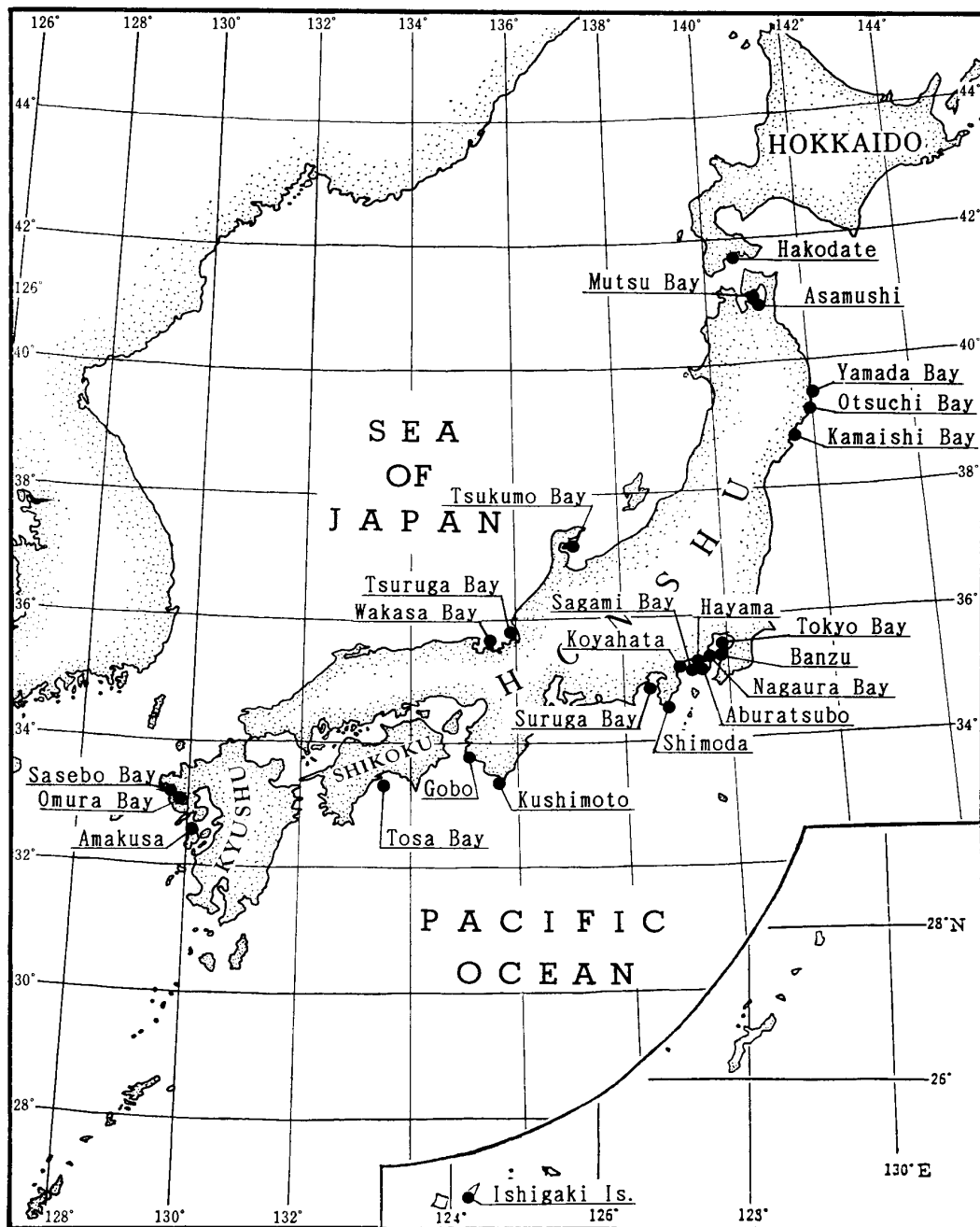


Fig. 1. Map of Japan, showing localities mentioned in text.

ing to near tip of branchiae; first pair of branchiae usually larger, extending back to setigers 7–9 (Fig. 2 a, b).

Setiger 1 reduced, with only digitiform neuropodial lamellae bearing neurosetae, smaller than subsequent setigers; notopodia lacking (Fig. 2 b). Parapodia of setiger 2 with erect, lanceolate notopodial postsetal lamellae and triangular neuropodia with long axis extending ventrally (Fig. 2 c). Notopodial lamellae of setiger 3 enlarged,

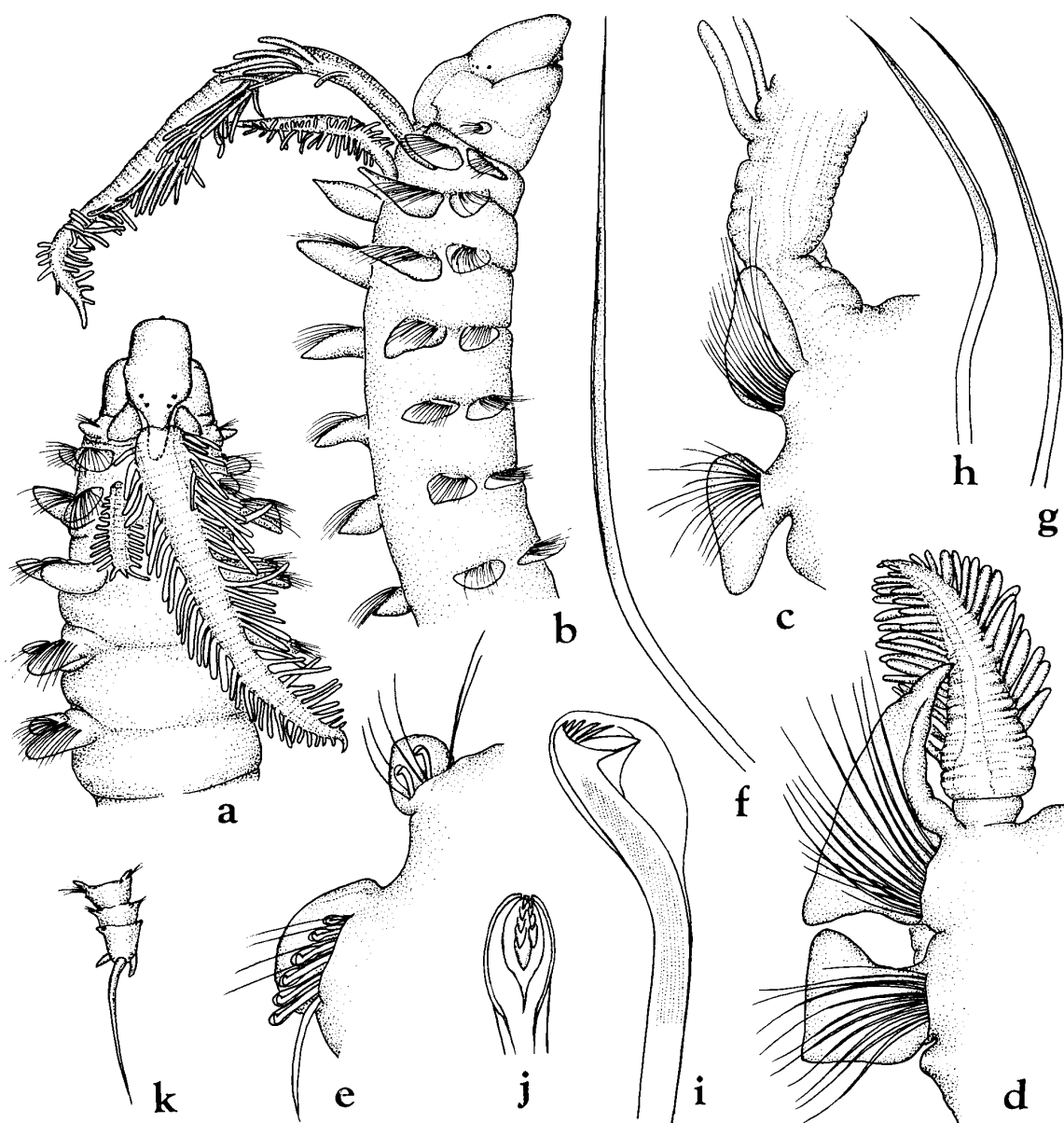


Fig. 2. *Prionospio* (*Aquilaspio*) *sexoculata* AUGENER. — a, Anterior end, dorsal view, two branchiae removed, $\times 44$; b, same, lateral view, left branchiae removed, $\times 44$; c, second parapodium (first branchial segment), anterior view, $\times 122$; d, third parapodium (second branchial segment), anterior view, $\times 122$; e, median parapodium, anterior view, $\times 122$; f, g, long (f) and short (g) notopodial setae from third parapodium, $\times 353$; h, ventral sabre seta, $\times 353$; i, hooded hook, lateral view, $\times 900$; j, distal part of same, frontal view, $\times 900$; k, posterior end, dorsal view, $\times 44$.

triangular, with pointed tip, slightly folded anteriorly; neuropodial lamellae broadly triangular (Fig. 2 d). Median parapodia with small, bluntly triangular notopodial lamellae and flattened neuropodial lamellae (Fig. 2 e). No membraneous dorsal crests.

Anterior noto- and neuropodial setae all moderately granulated capillaries with distinct sheath (Fig. 2 f, g); setae arranged in two rows. Ventral sabre setae from setiger 10, numbering one per fascicle, each seta rather slender, bilimbate, moderately granulated (Fig. 2 h). Neuropodial hooded hooks from setiger 16–17, numbering up to eight per fascicle; notopodial hooks from setiger 29–30, numbering up to four per fascicle; hooks accompanied by capillaries throughout; hooks with four tiers of two small teeth and one single apical tooth above main fang (Fig. 2 i, j) or with three small teeth in lower tier; secondary hood small.

Pygidium with one long dorsomedial and two shorter ventrolateral cirri (Fig. 2 k).

Remarks. Based on specimens from South African estuaries, DAY (1955) corrected AUGENER's (1918) description of the origin of the branchiae and variety of eyespots of *Prionospio sexoculata*. The characteristics of specimens from Japanese waters agree well with DAY's notes.

The species is new to the Japanese fauna.

Distribution. South West Africa; Japan; intertidal to 20 m.

***Prionospio (Aquilaspio) krusadensis* FAUVEL, 1929**

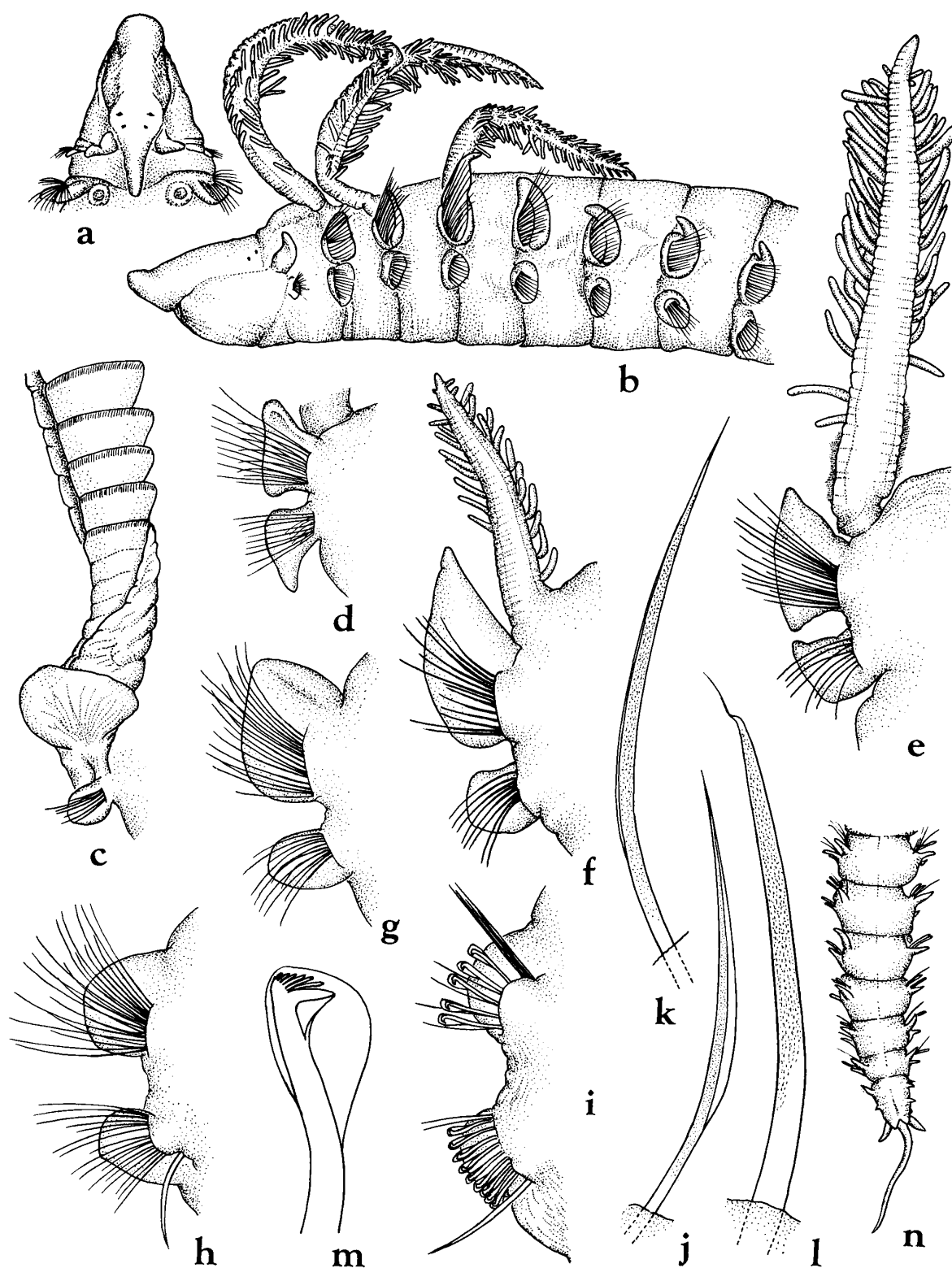
(Fig. 3 a–n)

Prionospio krusadensis FAUVEL, 1929, pp. 182–184, fig. 2; 1930, pp. 38–39, fig. 9; 1953, pp. 326–327, fig. 171; OKUDA, 1937, pp. 244–246, text-fig. 21; IMAJIMA & HARTMAN, 1964, pp. 284–285.
Aquilaspio aucklandica: HUTCHINGS & TURVEY, 1984 (not AUGENER, 1924).

Material examined. Otsuchi Bay, 39°20.4'N, 141°55.8'E, in 10 m (1), VII–1985. Banzu, Chiba Pref., in 3 m (8), in 6 m (3), VI–1974. Tokyo Bay, 35°28.0'N, 139°58.0'E, in 10 m (10), 35°20.5'N, 139°48.0'E, in 18 m (1), XI–1971, 35°23.0'N, 139°45.0'E, in 20 m (9), VI–1973, KT–73–6, 35°32.2'N, 139°55.0'E, in 18 m (1), 35°25.0'N, 139°47.0'E, in 33 m (1), III–1975, KT–75–2, 35°20.0'N, 139°46.0'E, in 14 m (1), V–1982, 35°31.0'N, 139°48.0'E, in 8 m (1), III–1983. Nagaura Bay, Yokosuka, 35°18.0'N, 139°38.7'E, in 12 m (23), 35°18.8'N, 139°39.7'E, in 14 m (4), X–1977. Aburatsubo Bay, Miura Peninsula, intertidal zone (53), IV–1964. Off Aburatsubo Bay, in 10 m (19), III–1979. Chojagasaki, Hayama, intertidal zone (9), III–1966. Off Koyahata, Sagami Bay, in 30 m (4), in 68 m (1), in 70 m (1), VI–1966. Sagami Bay, 35°09.4'N, 139°37.0'E, in 11 m (3), V–1979, 35°17.2'N, 139°32.2'E, in 15 m (1), VII–1979, 35°16.5'N, 139°33.4'E, in 12 m (1), X–1985. Oura Bay, Shimoda, intertidal zone (79), X–1970. Off Shimoda, 34°39.7'N, 138°57.0'E–34°39.6'N, 138°56.9'E, in 17–28 m (1), X–1981. Tomioka Bay, Amakusa, intertidal zone (8), V–1978, coll. H. TSUTSUMI. Kabira Bay, Ishigaki Is., in 10–16 m (19), III–1974, coll. M. HORIKOSHI.

Description. Largest complete individual including oocytes, with 112 setigers measuring 26 mm in length and about 0.6 mm in width including parapodia. Body slender, subcylindrical, colorless in alcohol.

Prostomium spindle-shaped, bluntly rounded anteriorly, widest at midregion,



tapering posteriorly as narrow caruncle to posterior margin of setiger 1; two pairs of small eyes arranged in rectangle, anterior pair largest. Peristomium forming moderate lateral wings, dorsally fused with setiger 1 (Fig. 3 a, b).

Branchiae present from setiger 2, numbering 3 pairs, first pair the largest; each branchia with digitiform pinnules extending to near tip of branchiae, pinnules irregularly arranged on posterior side (Fig. 3 b, e, f).

Parapodia of setiger 1 with lanceolate notopodial lamellae lacking setae and small conical neuropodial postsetal lamellae bearing neurosetae (Fig. 3 b, c). Parapodia of setiger 2 with ear-like notopodial lamellae and subtriangular neuropodial lamellae, with long axis of neuropodia extending ventrally (Fig. 3 d). Notopodial postsetal lamellae on setiger 3 becoming subrectangular with pointed distal end; neuropodial lamellae subrectangular (Fig. 3 e). Notopodial postsetal lamellae largest on setiger 4, triangular with pointed tip (Fig. 3 f); neuropodial lamellae rounded. Following notopodial lamellae gradually decreasing in size and becoming lower, rounded (Fig. 3 g, h). Noto- and neuropodial lamellae on median parapodia low, rounded (Fig. 3 i). No membraneous dorsal crests extending between parapodia.

Anterior noto- and neuropodial setae all sheathed capillaries; setae of anterior row shorter, broadly sheathed (Fig. 3 j); setae of posterior row longer, with narrow sheath; all capillaries moderately granulated (Fig. 3 k). Ventral sabre setae from neuropodial setiger 10 on all specimens examined, numbering one per fascicle; each seta exhibiting distinct granulations and short, distal filament (Fig. 3 l). Neuropodial hooded hooks from setiger 16–21, numbering up to nine per fascicle; notopodial hooks from setiger 27–31, numbering up to five per fascicle; hooks accompanied by capillaries throughout; hooks with 5–6 small teeth visible in profile, arranged in multiple rows above main fang.

Pygidium with one long medial and two shorter dorsolateral cirri (Fig. 3 n).

Remarks. *Prionospio (Aquilaspio) krusadensis* FAUVEL, 1929, from Gulf of Mannar, India is similar to *P. (A.) aucklandica* AUGENER, 1923, from New Zealand in having three pairs of pinnate branchiae. *P. (A.) krusadensis* was synonymized with *P. (A.) aucklandica* by FOSTER (1971) and this synonymy was recognized by BLAKE & KUDENOV (1978). However, *P. (A.) krusadensis* may be distinguished from *P. (A.) aucklandica* in the following characters: (1) notopodial setae on setiger 1 are lacking, rather than present, and (2) notopodial postsetal lamellae are largest on setiger 4, rather than on setiger 5.

Fig. 3. *Prionospio (Aquilaspio) krusadensis* FAUVEL. — a, Anterior end, dorsal view, showing prostomium, $\times 44$; b, anterior end, lateral view, right branchiae removed, $\times 44$; c, first parapodium and basal part of palp, anterior view, showing lacking of notosetae, $\times 96$; d, second parapodium, anterior view, $\times 88$; e, third parapodium with branchia, anterior view, $\times 88$; f, fourth parapodium with branchia, anterior view, $\times 88$; g, fifth parapodium, anterior view, $\times 88$; h, 15th parapodium, $\times 88$; i, median parapodium, anterior view, $\times 122$; j, k, short (j) and long (k) notopodial setae, $\times 420$; l, ventral sabre seta, $\times 900$; m, hooded hook, $\times 900$; n, posterior end, dorsal view, $\times 37$.

HUTCHINGS and TURVEY (1984, pp. 8–9) reported *Aquilaspio aucklandica* (AUGENER) from South Australia. However, the description given corresponds with that of *Prionospio* (*Aquilaspio*) *krusadensis* FAUVEL.

By courtesy of Dr. G. HARTMANN-SCHRÖDER, Zoologisches Institut und Zoologisches Museum, Hamburg, a specimen considered to be a syntype of *Prionospio aucklandica* (V-9741) from Colville Channel, 35 fathoms, was examined. The specimen is incomplete, consisting of 21 setigers measuring 6.5 mm in length. However, this specimen is a *Paraprimonospio*.

Distribution. Gulf of Mannar, Krusadai Island, India; Japan; ? South Australia; intertidal to 33 m.

***Prionospio* (*Aquilaspio*) *grossa* sp. nov.**

(Figs. 4 a–f, 5 a–h)

Material examined. Off Koyahata, Sagami Bay, 35°16.1'N, 139°12.8'E, in 154 m (holotype), V-1966. Off Kunozan, Suruga Bay, 35°56.6'N, 138°31.1'E, in 80 m (1), VII-1967. Tosa Bay, 33°23.1'N, 133°37.4'E, in 80 m (1), IV-1970.

Description. All material posteriorly incomplete. Holotype largest, measuring 21 mm in length and 3.5 mm in width for 46 setigers including parapodia.

Prostomium broadly rounded anteriorly, expanded laterally, usually appearing bellshaped with two pairs of eyes, anterior pair spherical, posterior pair bean-shaped; narrow caruncle extending posteriorly to middle of setiger 3; caruncle surrounded by nuchal organs on either side (Fig. 4 a–c). Peristomium broad, fused with setiger 1, surrounding prostomium (Fig. 4 c).

Branchiae present from setiger 2, numbering four pairs; branchiae becoming shorter posteriorly, with numerous digitiform pinnules arising on lateral and posterior sides (Fig. 4 d).

Parapodia of setiger 1 well-developed; notopodia T-shaped in profile (Fig. 4 b) or hat-shaped in antero-dorsal view (Fig. 4 c), with lanceolate postsetal lamellae and conical presetal lamellae; notosetae arising from inferior half of presetal lobe. Neuropodia of setiger 1 with semicircular postsetal lamellae and rounded presetal lamellae, with neurosetae (Fig. 4 e). Subsequent parapodia with erect, triangular notopodial postsetal lamellae and blunt triangular neuropodial postsetal lamellae; both noto- and neuro-presetal lamellae semicircular (Figs. 4 f, 5 a). Notopodial postsetal lamellae larger on setigers 6 to 8, then smaller posteriorly (Fig. 5 b). Dorsal crest well developed, beginning from setiger 5 (fourth branchial segment), continuing to setiger 23 (Figs. 4 d, 5 a); thereafter, only short crests near notopodia, not connected to form ridges (Fig. 5 b).

Anterior setae all moderately granulated, sheathed capillaries, finer in setiger 1 (Fig. 5 c), thicker and with broad sheath in subsequent setigers (Fig. 5 d, e), becoming finer again posteriorly (Fig. 5 f). Neuropodial hooded hooks from setiger 18, numbering up to 16 per fascicle; notopodial hooded hooks from setiger 43, numbering

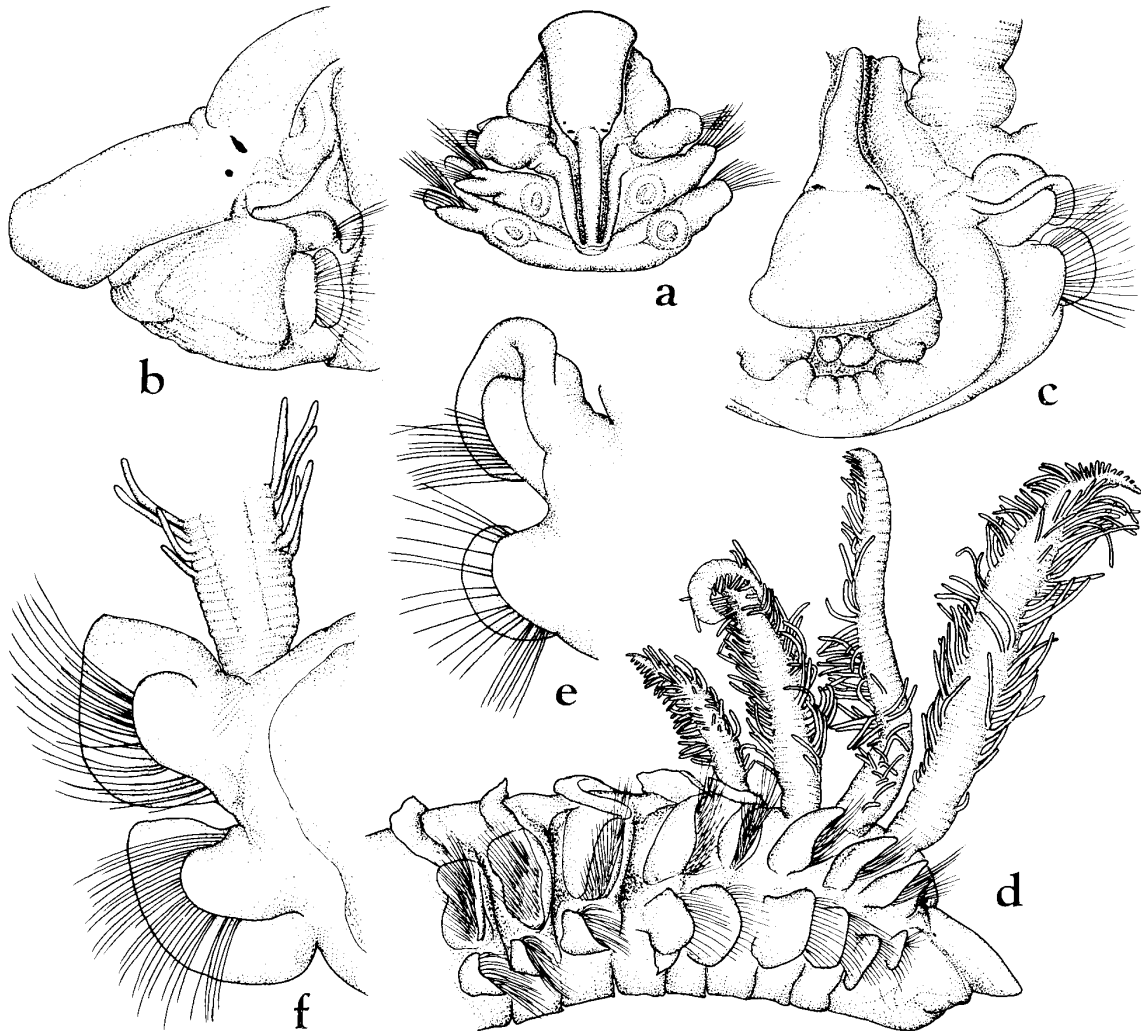


Fig. 4. *Prionospio (Aquilaspio) grossa* sp. nov. — a, Anterior end, dorsal view, showing prostomium, $\times 16$; b, prostomium and first parapodium, lateral view, palps removed, $\times 34$; c, same, antero-dorsal view, palps removed, $\times 34$; d, anterior end, lateral view, left branchiae omitted, $\times 16$; e, first parapodium, anterior view, $\times 50$; f, fourth parapodium (third branchial segment), anterior view, $\times 34$.

up to 12 per fascicle; hooks with 5–6 tiers of small teeth arranged in multiple rows above main fang, primary hood inflated, secondary hood small (Fig. 5 g). Ventral sabre-like setae from neuropodia setiger 19, numbering 3–4 per fascicle (Fig. 5 b); each seta rather slender, distally granulated (Fig. 5 h). Nature of pygidium unknown.

Remarks. *Prionospio (Aquilaspio) grossa* is similar to *P. (A.) multipinnulata* BLAKE & KUDENOV, 1978, from southeastern Australia, *P. (A.) peruana* HARTMANN-SCHRÖDER, 1962, from Peru, *P. (A.) pyramidalis* (HUTCHINGS & TURVEY, 1984), from south Australia, *P. (A.) tenuis* VERRILL, 1880, from New England, *P. (A.) tetelensis* GIBBS, 1971, from the Solomon Islands and *P. (A.) treadwelli* HARTMAN, 1951, the

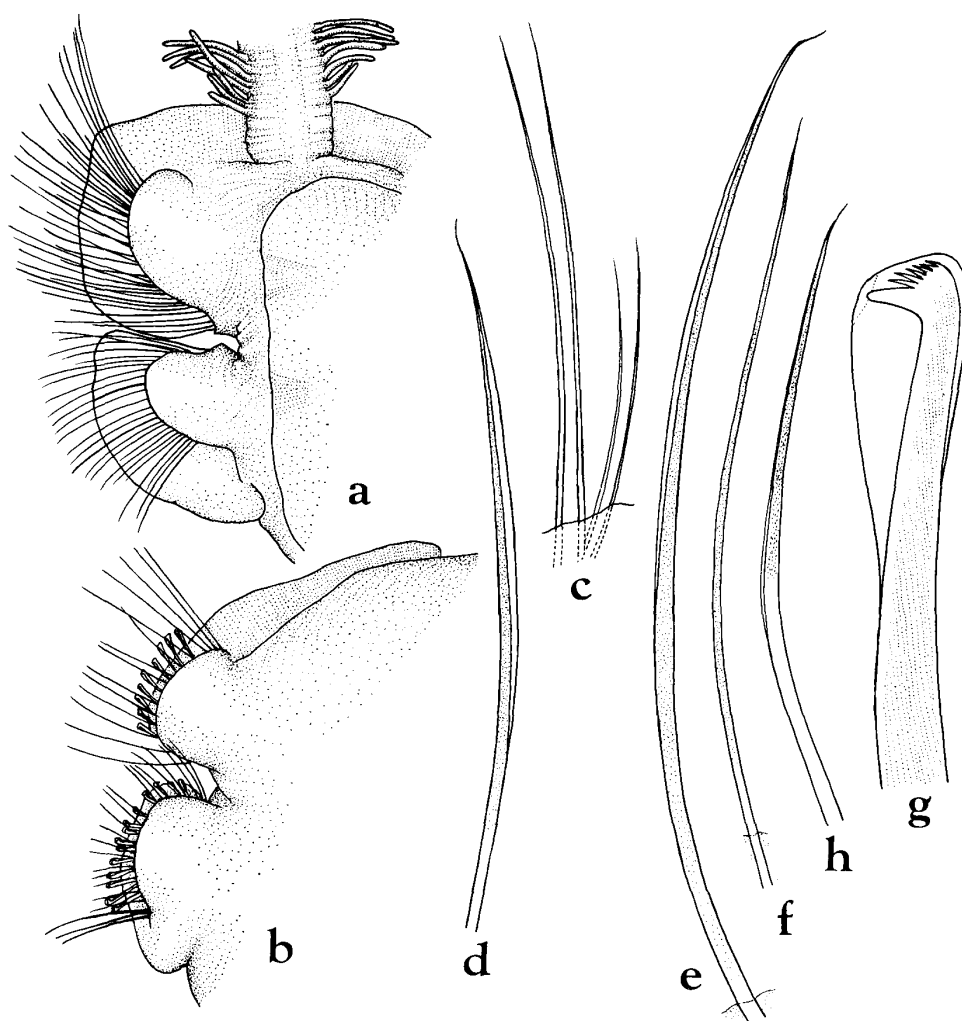


Fig. 5. *Prionospio (Aquilaspio) grossa* sp. nov. — a, Fifth parapodium (fourth branchial segment), anterior view, showing dorsal crest, $\times 34$; b, median parapodium, anterior view, $\times 40$; c, part of first notopodial fascicle, $\times 156$; d, e, short (d) and long (e) notopodial setae from setiger 5, $\times 156$; f, notopodial seta from median parapodium, $\times 156$; g, hooded hook, lateral view, $\times 780$; h, ventral sabre seta, $\times 156$.

Gulf of Mexico, in possessing four pairs of pinnate branchiae on setigers 2–5.

Of these species, *Prionospio (Aquilaspio) grossa* is most closely related to *P. (A.) tetelensis* in having a caruncle that extends back to setiger 3 and dorsal crests between parapodia. However, *P. (A.) grossa* differs from *P. (A.) tetelensis* in having notopodial setae on setiger 1, and the dorsal crests beginning from setiger 5 (fourth branchial segment), rather than lacking notopodial setae on setiger 1 and with dorsal crests from setiger 6.

Type. Holotype, NSMT-Pol. H 297.

Distribution. Japan; 80–154 m.

Prionospio (Aquilaspio) convexa sp. nov.

(Fig. 6 a–g)

Material examined. Off Shimoda, in 37–39 m (1), IX–1987; Off Kushimoto, in 34–57 m (holotype and 8 paratypes), VII–1978; off Gobo, in 25 m (4), VII–1976.

Description. All material posteriorly incomplete. Holotype largest, with 64 setigers measuring 36 mm in length and 3.8 mm in width including parapodia.

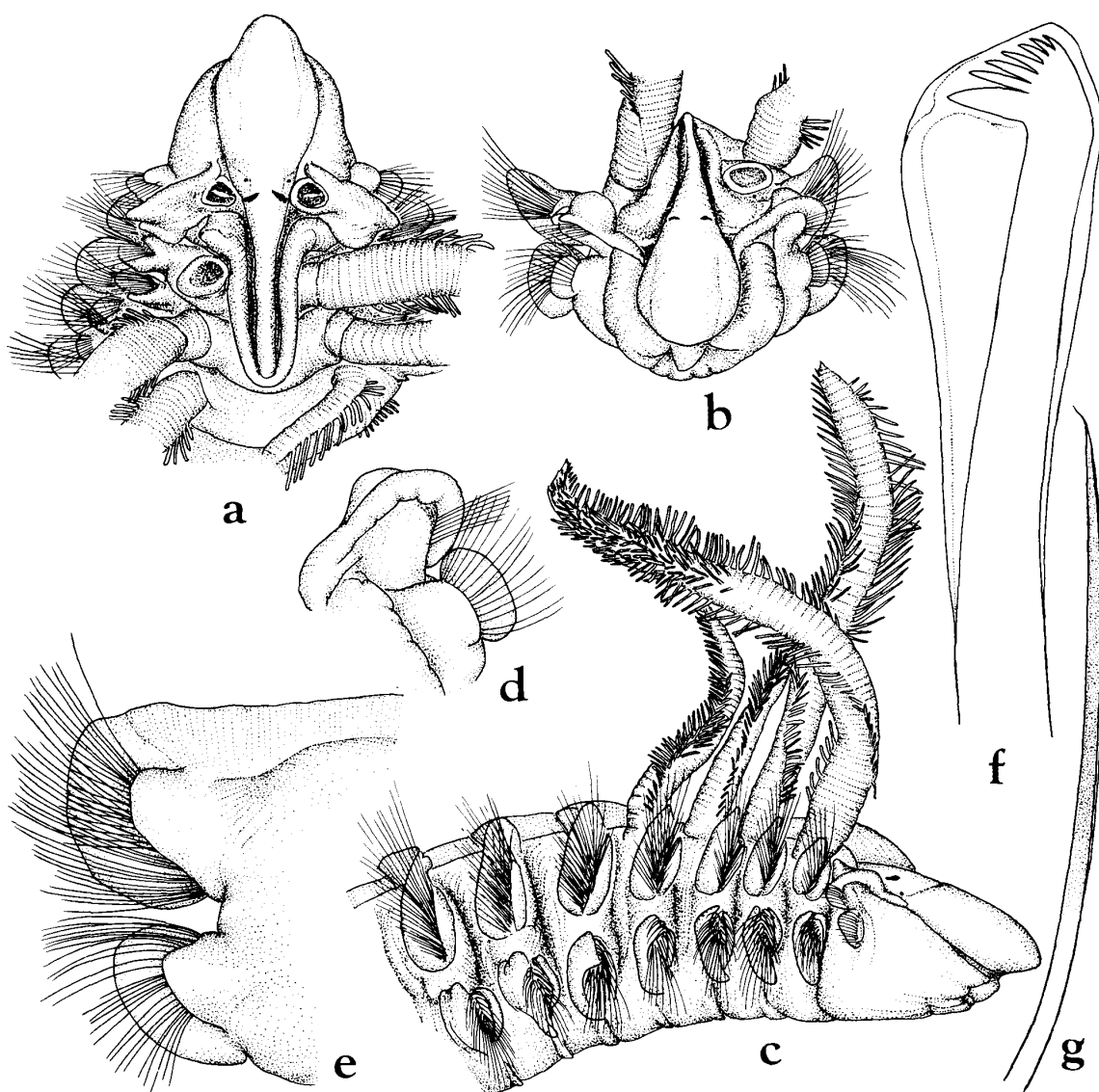


Fig. 6. *Prionospio (Aquilaspio) convexa* sp. nov. — a, Anterior end, dorsal view, palps and first left branchia removed, $\times 20$; b, anterior end, antero-dorsal view, $\times 20$; c, anterior end, lateral view, palps removed, $\times 18$; d, first parapodium, anterior view, $\times 40$; e, sixth parapodium, anterior view, $\times 30$; f, hooded hooks, lateral view, $\times 840$; g, ventral sabre seta, $\times 170$.

Prostomium fusiform, anteriorly convex, tapering posteriorly with slender caruncle extending to base of setiger 3, with nuchal organs along either side; two pairs of eyes, anterior pair small and posterior pair crescent-shaped. Peristomium broad, fused with setiger 1, surrounding prostomium (Fig. 6 a, b).

Branchiae present from setiger 2, numbering four pairs, becoming shorter posteriorly, with numerous digitiform pinnules arising on lateral and posterior sides (Fig. 6 c).

Parapodia of setiger 1 well-developed; notopodia T-shaped in profile (Fig. 6 c), with lanceolate postsetal lamellae; presetal lamellae conical, notosetae arising from limited narrow area (Fig. 6 d); neuropodia with semicircular postsetal lamellae and rounded presetal lamellae, with neurosetae (Fig. 6 d). Subsequent parapodia with erect notopodial postsetal lamellae, and blunt triangular neuropodial postsetal lamellae; noto- and neuropodial presetal lobes semicircular (Fig. 6 e). Notopodial postsetal lamellae becoming larger on setigers 7–10, then gradually smaller posteriorly. Dorsal crests well developed, connecting notopodial lamellae; crests begin on setiger 6 and continue to setiger 23, interrupted on dorsum thereafter (Fig. 6 e).

Anterior setae all sheathed capillaries, with anterior row shorter than posterior row. Neuropodial hooded hooks present from setiger 20, numbering up to 14 per fascicle; notopodial hooks present from setiger 52, numbering up to 10 per fascicle; hooks with 5–6 tiers of small teeth arranged in multiple rows above main fang, primary hood inflated, secondary hood small (Fig. 6 f). Ventral sabre setae from neuropodial setiger 19, numbering 2–4 per fascicle; each seta moderately granulated, with narrow sheath (Fig. 6 g). Nature of pygidium unknown.

Remarks. *Prionospio (Aquilaspio) convexa* is closely related to *P. (A.) tetelensis* GIBBS, 1971 and *P. (A.) grossa*, described above, in having anterior dorsal crests and a caruncle that extends to the base of setiger 3. However, *P. (A.) convexa* differs from *P. (A.) tetelensis* in the shape of the prostomium and in the presence of the notosetae on setiger 1. *P. (A.) convexa* may be distinguished from *P. (A.) grossa* in the shape of the prostomium and in the first appearance of the dorsal crests on setiger 6 rather than on setiger 5.

Type-series. Holotype, NSMT-Pol. H 298; 8 paratypes, NSMT-Pol. P 299.

Distribution. Japan; 25–57 m.

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